UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,247	10/27/2003	Wayne Dawson	F-8015	5890

28107 7590 09/12/2007
JORDAN AND HAMBURG LLP
122 EAST 42ND STREET
SUITE 4000
NEW YORK, NY 10168

EXAMINER	
SKOWRONEK, KARLHEINZ R	

ART UNIT	PAPER NUMBER
1631	

MAIL DATE	DELIVERY MODE
09/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/695,247	DAWSON ET AL.	
	Examiner	Art Unit	
	Karlheinz R. Skowronek	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,11 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/26/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Status

Claims 1-13 are pending.

Claim 12 stands withdrawn as being directed to a non-elected invention.

Claims 1-11 and 13 are being examined.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 26 December 2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statement.

Specification

Response to Arguments

Applicant's arguments, see p. 13, filed 05 April 2007, with respect to the objection to the title have been fully considered and are persuasive. The objection of the title has been withdrawn.

The amendment, filed 05 April 2007, made to correct minor formalities in the specification at page 7-9 and 11-12 will be entered.

Claim Objections

Response to Arguments

Applicant's arguments, see p. 13, filed 05 April 2007, with respect to the objection to claims 8 and 13 have been fully considered and are persuasive. The objection to claims 8 and 13 has been withdrawn.

Claim Rejections - 35 USC § 112, 2nd Paragraph

Response to Arguments

Applicant's arguments, see p. 13-14, filed 05 April 2007, with respect to the rejection of claims 1-11 and 13 under 35 USC 112, 2nd parahgraph have been fully considered and are persuasive. The rejection of claims 1-11 and 13 has been withdrawn.

Claim Rejections - 35 USC § 112, 1st Paragraph

Response to Arguments

Applicant's arguments, see p. 13-14, filed 05 April 2007, with respect to the rejection of claims 1-11 and 13 under 35 USC 112, 1st paragraph have been fully considered and are persuasive. The rejection of claims 1-11 and 13 has been withdrawn.

Claim Rejections - 35 USC § 101

Claims 1 and 3-7 are drawn to a process. A statutory process must include a step of a physical transformation, or produce a useful, concrete, and tangible result (State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d

1596 (1998), AT&T Corp. v. Excel Communications Inc. (CAFC 50 USPQ2d 1447 (1999)). The instant claims do not result in a physical transformation, thus the Examiner must determine if the instant claims include a useful, concrete, and tangible result.

As noted in State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998) below, the statutory category of the claimed subject matter is not relevant to a determination of whether the claimed subject matter produces a useful, concrete, and tangible result:

> The question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to -- process, machine, manufacture, or composition of matter--but rather on the essential characteristics of the subject matter, in particular, its practical utility. Section 101 specifies that statutory subject matter must also satisfy the other "conditions and requirements" of Title 35, including novelty, nonobviousness, and adequacy of disclosure and notice. See *In re Warmerdam*, 33 F.3d 1354, 1359, 31 USPQ2d 1754, 1757-58 (Fed. Cir. 1994). For purpose of our analysis, as noted above, claim 1 is directed to a machine programmed with the Hub and Spoke software and admittedly produces a "useful, concrete, and tangible result." *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557. This renders it statutory subject matter, even if the useful result is expressed in numbers, such as price, profit, percentage, cost, or loss.

In determining if the claimed subject matter produces a useful, concrete, and tangible result, the Examiner must determine each standard individually. For a claim to be "useful," the claim must produce a result that is specific, and substantial. For a claim to be "concrete," the process must have a result that is reproducible. For a claim to be "tangible," the process must produce a real world result. Furthermore, the claim must be limited only to statutory embodiments.

Claims 1 and 3-7 do not produce a tangible result. A tangible result requires that the claim must set forth a practical application to produce a real-world result. This

rejection could be overcome by amendment of the claims to recite that a result of the method is outputted to a display or a memory or another computer on a network, or to a user, or by including a physical transformation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following rejection is newly applied.

Claim 1 and 3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Alm et al. (Proc. Natl. Acad. Sci., Vol. 96, p.11305-11310, September 1999).

Claim 1 is drawn to a method that uses an entropy evaluation model combined with other thermodynamic potentials as a protein-folding model to predict topology. In some embodiments, the entropy model is used to evaluate the loss in entropy due to folding into a particular topology. In some embodiments, the initial estimate is calculated from the experimental sources that are derived from x-ray crystallography.

Alm et al. show a method for predicting protein folding using native-state topology. Alm et al. show that an entropy evaluation model that accounts for the global contributions to entropy is used(p. 11307, col 2). Alm et al. show the prediction of protein topologies (fig. 3). In some embodiments, Alm teach the entropy model is used

to evaluate the loss in entropy due to folding into a particular topology (p. 11306, col.1). In some embodiments, Alm et al. show the initial estimate is calculated from the experimental sources that are derived from x-ray crystallography (p. 11306, col. 1).

The following rejection is newly applied.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Floudas et al. (USPAT 6,832,162).

Claim 1 is drawn to a method that uses an entropy evaluation model combined with other thermodynamic potentials as a protein-folding model to predict topology.

Floudas et al. teach a method of predicting protein topologies. Floudas et al. show that a global entropy model is used to evaluate the folding of a protein (col 15, eq. 8).

Response to Arguments

Applicant's arguments, see p.15-20, filed 05 April 2007, with respect to the rejection of claims 1, 3, 8, and 13 under 35 USC 102(b) as anticipated by Dawson et al. have been fully considered and are persuasive. The rejection of claims 1, 3, 8, and 13 has been withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following rejection is newly applied.

Claim 1-7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Floudas et al. (USPAT 6,832,162) in view of Alm et al. (Proc. Natl. Acad. Sci., Vol. 96, p.11305-11310, September 1999).

The claims are drawn to a method that uses an entropy evaluation model combined with other thermodynamic potentials as a protein-folding model to predict topology. In some embodiments, the entropy model is used to evaluate the loss in entropy due to folding into a particular topology. In some embodiments, the initial estimate is calculated from the experimental sources that are derived from x-ray crystallography. In some embodiments the method involves the steps of inputting an amino acid sequence; preparing secondary structure information; applying the model to evaluate free energy; applying the model in conjunction with other thermodynamic parameters; predicting folding kinetics; and and storing the data. In some embodiments, the evaluation is done in polynomial time.

Floudas et al. teach a method of predicting protein topologies. Floudas et al. show that a global entropy model is used to evaluate the folding of a protein (col 15, eq. 8). In some embodiments, Floudas et al. teach the initial estimate is calculated from the experimental sources (col. 9, line 39-52). In some embodiments, sequence alignment is used to supplement the estimate (col 10, line 1-12). In some embodiments the method involves the steps of inputting an amino acid sequence (fig. 2 and col 11, line 20-24); preparing secondary structure information (col. 11, line 2-5); applying the model to evaluate free energy (col 11, line 27-29); applying the model in conjunction with other thermodynamic parameters (col. 13, line 25-30). In some embodiments, Floudas et al. show evaluations are made in polynomial time (col 10. line 19-21).

Floudas et al. do not show predicting folding kinetics and storing the data.

Alm et al. show a method for predicting protein folding using native-state topology. Alm et al. show that an entropy evaluation model that accounts for the global contributions to entropy is used (p. 11307, col 2). Alm et al. show the prediction of protein topologies (fig. 3). In some embodiments, Alm et al. teach the entropy model is used to evaluate the loss in entropy due to folding into a particular topology (p. 11306, col.1). In some embodiments, Alm et al. show the initial estimate is calculated from the experimental sources that are derived from x-ray crystallography (p. 11306, col. 1). In some embodiments, Alm et al. show that folding kinetics is predicted (p. 11306, col. 1). In some embodiments, Alm et al. show that the information is stored (fig 1 and p. 11306, col. 2). Alms et al. show that a simple treatment of the interactions in a native protein is sufficient to account for most of the experimental data available on the folding of small protein domains (p. 11305, col. 2).

It would have been obvious for one of skill in the art at the time the invention awas made to modify the method of Floudas et al. for predicting tertiary protein structures and topology with the method of Alm et al. for predicting protein folding from free energy landscapes because. This is an advantage because it simplifies the computation.

The following rejection is newly applied.

Claim 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Floudas et al. (USPAT 6,832,162) in view of Alm et al. (Proc. Natl. Acad. Sci., Vol. 96, p.11305-11310, September 1999) in view of Dawson et al..

The claims are drawn to a method that uses an entropy evaluation model combined with other thermodynamic potentials as a protein-folding model to predict topology. In some embodiments, the entropy model is used to evaluate the loss in entropy due to folding into a particular topology. In some embodiments, the initial estimate is calculated from the experimental sources that are derived from x-ray crystallography. In some embodiments the method involves the steps of inputting an amino acid sequence; preparing secondary structure information; applying the model to evaluate free energy; applying the model in conjunction with other thermodynamic parameters; predicting folding kinetics; and storing the data. In some embodiments, the evaluation is done in polynomial time.

Floudas et al. teach a method of predicting protein topologies. Floudas et al. show that a global entropy model is used to evaluate the folding of a protein (col 15, eq. 8). In some embodiments, Floudas et al. teach the initial estimate is calculated from the experimental sources (col. 9, line 39-52). In some embodiments, sequence alignment is used to supplement the estimate (col 10, line 1-12). In some embodiments the method involves the steps of inputting an amino acid sequence (fig. 2 and col 11, line 20-24); preparing secondary structure information (col. 11, line 2-5); applying the model to evaluate free energy (col 11, line 27-29); applying the model in conjunction with other thermodynamic parameters (col. 13, line 25-30). In some embodiments, Floudas et al. show evaluations are made in polynomial time (col 10. line 19-21).

Fluodas et al. do not show predicting folding kinetics and storing the data.

Alm et al. show a method for predicting protein folding using native-state topology. Alm et al. show that an entropy evaluation model that accounts for the global contributions to entropy is used (p. 11307, col 2). Alm et al. show the prediction of protein topologies (fig. 3). In some embodiments, Alm et al. teach the entropy model is used to evaluate the loss in entropy due to folding into a particular topology (p. 11306, col.1). In some embodiments, Alm et al. show the initial estimate is calculated from the experimental sources that are derived from x-ray crystallography (p. 11306, col. 1). In some embodiments, Alm et al. show that folding kinetics is predicted (p. 11306, col. 1). In some embodiments, Alm et al. show that the information is stored (fig 1 and p. 11306, col. 2). Alms et al. show that a simple treatment of the interactions in a native protein is sufficient to account for most of the experimental data available on the folding of small protein domains (p. 11305, col. 2).

Floudas et al. and Alm et al. do not show a calculation of entropy by equation 1.

Dawson et al. show a method for calculating entropy of biopolymers. Dawson et al. use nucleic acids as an exemplary demonstration of the global strategy for estimating entropy. Although, the method is mostly directed to nucleic acids Dawson suggest that the calculation can be applied to proteins and to the evaluation of free energy in protein folding (p.377, col. 2). Dawson et al. show teach the equation

$\Delta S_{i,j} = \frac{\gamma k_B}{\xi}\left[\ln\left(\frac{2\gamma\xi N_{i,j}}{3\lambda^2}\right) - 1 + \left(\frac{3\lambda^2}{2\gamma\xi N_{i,j}}\right)\right]$ (p.368, eqn 9), after the terms $\theta(\xi)=\frac{1}{\xi}$ (eqn. 8) and $\psi = \frac{2\gamma\xi}{3\lambda^2}$ are substituted into Eqn. 9. Further, it is well known in the art that

$\Delta G = \Delta H - T\Delta S$ and Dawson et al. teach that the calculation total Gibb's free energy (p. 370, eqn. 16). Thus Dawson et al. teach the equation of claim 8. Dawson et al. teach the entropy calculation makes the correct predictions about the direction of folding in a biopolymer such as proteins (p. 378, col. 2).

It would have been obvious for one of skill in the art at the time the invention was made to modify the method of Fluodas et al. for predicting tertiary protein structures and topology with the method of Alm et al. for predicting protein folding from free energy landscapes because Alms et al. show that a simple treatment of the interactions in a native protein is sufficient to account for most of the experimental data available on the folding of small protein domains. This is an advantage because it simplifies the computation. It would be further obvious to modify the method of predicting protein folding of Floudas et al. in view of Alm et al. with the entropy calculation of Dawson et al. because Dawson et al. teach the entropy calculation makes the correct predictions about the direction of folding in a biopolymer such as proteins.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karlheinz R. Skowronek whose telephone number is (571) 272-9047. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie A. Moran can be reached on (571) 272-0720. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

6 September 2007

/KRS/
Karlheinz R. Skowronek
Assistant Examiner, Art Unit 1631

John S. Brusca 7 September 2007
JOHN S. BRUSCA, PH.D
PRIMARY EXAMINER